Glenn,
This w/ attachments went to TTP.
Thanks, Shelley

AUG 2 9 1988

SUBJECT: Jasper Mining District

FROM: Shelley Brodie SMB

TO: Scott Parrish and Trudy Fancher

Site Area:

I have taken the DGLS maps, had them reduced and made into overlays. The tracing paper on top of the bottom sheet was used to define the site area. As you can see, my outline is similar to Glenn's (Glenn Curtis - Scorer). I have provided tracing paper if you would like to outline the area. As you place each overlay on top of the previous one, I think it will be easier to see the area of concentrated mining activity.

Sample Points:

Reference #1: Effects of Abandoned Lead and Zinc Mines and Tailings Piles on Water Quality in Joplin Area, Missouri

Pg. 3 — The map shows the site area superimposed on the Jim Barks (USGS) study area. All sample points are marked in red. Water samples in mine shafts are included because the mines were finished in the same alluvial aquifer (p.5).

Pg. 37, 38 — These are the analytical results highlighted for easy reference.

Pg. 37, 38 — Repeat of pages 37 and 38 with no highlighting. These are included in case your copier changes highlighted areas into gray areas. This is 1976 data.

Reference #8: Assessment of Water Resources in Lead-Zinc Mined Areas in Cherokee County, Kansas and Adjacent Areas (This is a new reference, please add to bibliography.)

P. 4 — Site boundaries are superimposed on to Tim Spruill's (USGS) study area. This shows the similarity between site boundaries drawn by Glenn and the mined areas depicted by USGS.

P. 10 — The red border shows the western edge of the site boundary. Map numbers 23, 24, 28, 29 and 30 are locations of mine water samples. As you can see, these locations are basically right on state line, adjacent to Jasper site boundary. This is 1981 and 1982 data.

P. 14 Geologic section from near Treece, Kansas, to Joplin, Missouri. Glenn has inserted the location of the state line. This shows that the geological conditions at the Jasper site are very similar to those at Cherokee County, Kansas.

Thus far, you have 1976 data, 1981 and 1982 data. The assessment done by Tim Spruill (USGS) for Cherokee County and adjacent areas also uses historical data that is almost 20 years old (telephone communication). Data that spans 20 years and shows similar results indicates that the contamination is still present.

Current Conditions:

Glenn contacted the following people who are knowledgeable of the current conditions at Jasper County.

Jim Barks	- Chief of Hydrologic Studies Section, USGS
Daniel Stewart	- Mining Engineer/Mining Geologist
Tracey McCracken	- Environmental Specialist, MDNR

The attached records of communication provide documentation that conditions at Jasper County have remained relatively the same for over 20 years. Some tailings piles have been removed, but numerous others exist and mine shafts, pits and previously mined areas remain relatively unchanged.

Well Logs:

Glenn contacted the Missouri Geological Survey for water analyses on wells in the shallow aquifer. The attached list includes some wells outside the three-mile radius, but none of the wells have analytical results.

Attachments

TRIP REPORT AND DATA SUMMARY
TRI-STATE MINING/JASPER

Jeff Weatherford
SINV/EP&R/ENSV
September 12, 1986

INTRODUCTION

The Emergency Planning and Response Branch (EP&R) was tasked to perform a follow-up sampling investigation of the Tri-state Mining, Jasper site. The site is part of the Tri-State Lead/Zinc Mining District, which covers large areas in Kansas, Oklahoma and Missouri. This particular area of study is located in Jasper County, Missouri, and mainly encompasses what is known as the Oronogo-Dunweg Mineralization belt. The purpose of this sampling investigation was to resample local private wells that had shown concentrations of metals above drinking water recommendations when sampled in February 1986. A groundwater sample was also collected for the Tri-State Mining/Cherokee County, Kansas, site at the request of EPA/SPFD.

BACKGROUND

The Jasper County portion of the Tri-State Mining District is located to the east of the City of Joplin, Missouri, and is surrounded by the towns of Oronogo, Webb City, Carterville, Prosperity and Dunweg (Figure 1). This study area is covered by the Joplin East and Webb City USGS 7 1/2 minute topographic quadrangle maps.

Mining in the Missouri portion of the Tri-State District began around 1850, and continued until the 1950's when operations began to cease due to the drop in price for lead and zinc. The area covered by the Missouri portion is approximately 6240 square kilometers. However, the area being considered in this study is the Oronogo-Dunweg belt which was heavily mined and now contains numerous pits, shafts and tailings piles. It is thought that these tailings piles may be a source of contamination to local groundwater and surface water supplies.

The small towns of Webb City, Oronogo, Dunweg and Carterville receive their drinking water supply from the Cambrian-Ordivician dolomites known as the deep aquifer. The outlying residents maintain private wells in the Mississippian limestone layers known as the shallow aquifer. During a site investigation of this area in February 1986, 18 local private wells were sampled and analyzed for total metals concentration. Of these 18 wells, five showed levels of particular inorganic concentrations above that considered safe for human consumption. Table 1 summarizes the previous sampling results.

Figure 1 - Site map showing Oronogo-Buenweg study area and sample locations for Tri-state Mining/Jasper site

STATE OF MISSOURI
GEOLOGICAL SURVEY AND WATER RESOURCES
THOMAS R. BEVERIDGE, STATE GEOLOGIST

Figure 1a

JOPLIN EAST QUADRANGLE
MISSOURI
7.5 MINUTE SERIES

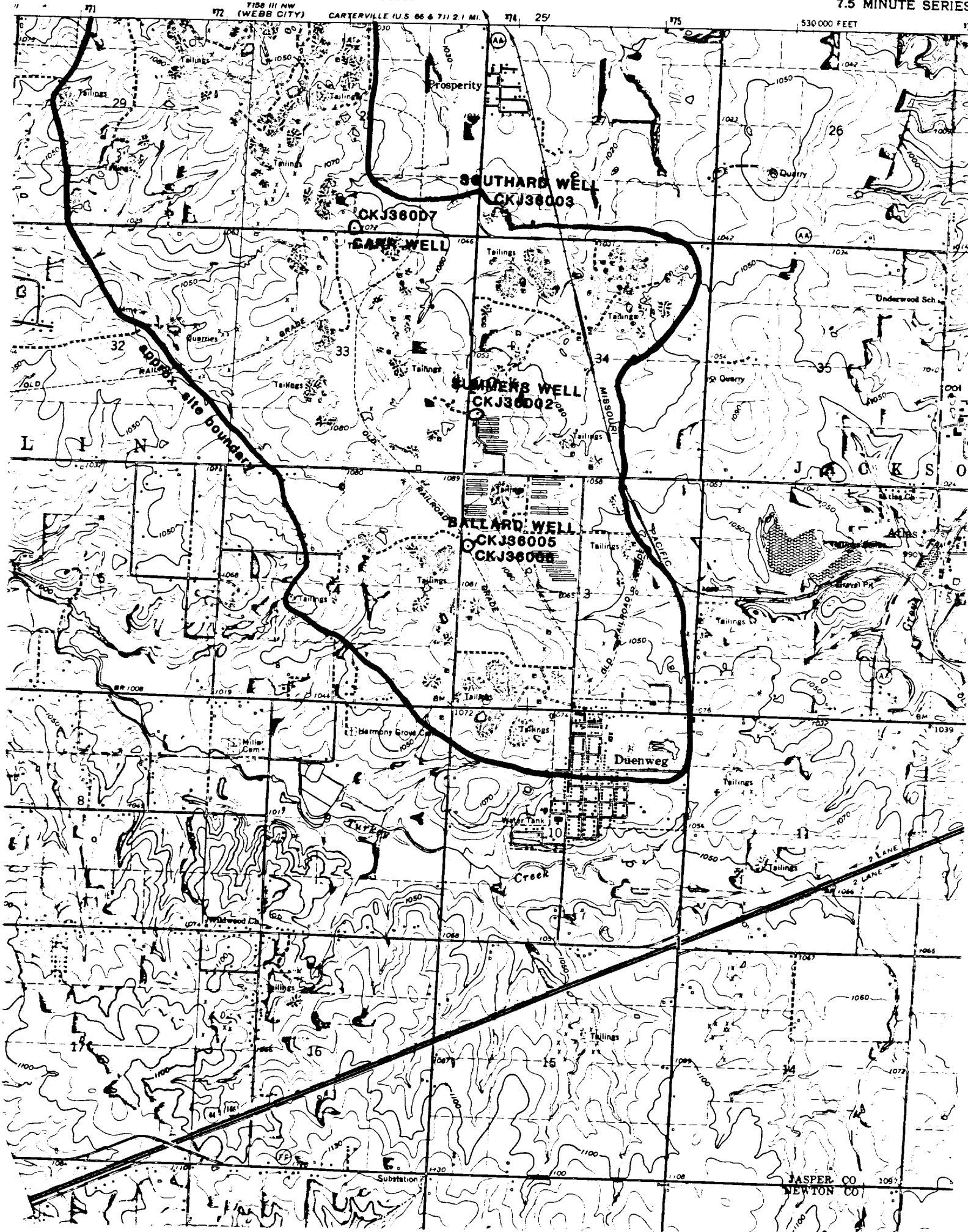

Table 1

Summary of February 1986 Sampling Results

	WELL OWNER	METAL OF CONCERN	CONCENTRATION	ACCEPTABLE LIMITS
1.	Elsie Pendergraft RR # 1 Webb City, MO	Cadmium	11 UG/L	10 UG/L*
2.	Ben Summers RR # 1 Joplin, MO	Cadmium	27 UG/L	10 UG/L*
3.	P.E. Carr RR # 1, Box 503 Joplin, MO	Nickle	47 UG/L	15 UG/L**
4.	Bobby Ballard RR # 7 Joplin, MO	Sodium	28,000 UG/L	20,000 UG/L***
5.	Emmitt Southard RR # 1 Joplin, MO	Lead	79 UG/L	5 UG/L*

*EPA Primary Drinking Water Standard

**CDC Memorandum of January 17, 1985, citing "Clean Water Act, Water Quality Criteria for Human Health - Adjusted for Drinking Water Only"

***Recommendation of National Research Council, Food and Nutrition Board (1954) for people on sodium restricted diets.

Letters addressing these concerns have been sent to the residents advising them of actions needed to be taken.

GENERAL DESCRIPTION OF FIELD WORK

An investigation team consisting of Paul Doherty and Jeff Weatherford, EP&R, arrived in Joplin, Missouri, on August 13, 1986, to resample wells that had shown high concentrations of certain metals when previously sampled in February 1986. Besides these wells, it was requested that two other wells be sampled at the request of the well owners.

Phone calls were made to notify residents that EPA would be by to sample their wells. Before collecting the samples, the water was allowed to run no less than five minutes. Field measurements of pH, temperature and conductivity were taken. Residents were also asked whether or not they maintained a water softening or filter system. Of the seven wells sampled, one maintained

a water softener and filter and one a filter only. Samples from these two wells were collected before the water entered the systems. Copies of the letters sent to the residents were taken along and shown to them. In some cases, it was neccessary to read these letters aloud. Our advice to them, when asked, was to consult a private physician about health effects related to the particular metal concentration found in their water.

During the sampling of the Ballard well, it was reported to the team by Mrs. Ballard that she had later realized the collection point for her sample taken in February 1986, was connected to a water treatment system. This system uses sodium to replace calcium and magnesium ions in the water. Therefore, the high sodium concentration found in this well can probably be attributed to this treatment system. Resampling of the Ballard well included collecting a sample before the system and one after.

At the request of the Superfund Branch (SPFD), a sample was also collected from a well in Cherokee County, Kansas, as part of the Tri-State Mining, Cherokee site (Figure 2). Along with a sample for total metals, a sample was collected and filtered in the field to be analyzed for dissolved metals. This well belongs to Mr. and Mrs. Roger Thompson who live north of Riverton, Kansas. No tailings piles or mining activity was visible near this residence. An in-line water filter was present and the samples were collected prior to this.

Another request for sampling was reported to EP&R by Miracle Water Company, a local water softener supplier, who reported that a well used by Mr. and Mrs. Ralph Bush contained cadmium at a concentration of 24 ppm. The residence is located off of Schifferdecker Road, a mile or so southeast of the City of Joplin's corporate limits (Figure 3). Origionally, it was believed that the well was located near the Vickers, Incorporated, facility and the well was targeted for metals and priority pollutant organic sampling at the request of the Resource Conservation and Recovery Act Branch (RCRA). However, when it was learned that this residence was located three miles south of Vickers, the request was cancelled by RCRA and the organics sample disposed of. A sample for the Tri-State Mining, Jasper site, was kept for analysis of total metals even though the residence is out of the study area for the Tri-State, Jasper site.

The Bushes were renting the house at the time of sampling and moved shortly after the well sample was collected. The Bushes have since expressed no further interest in receiving the sample results. The owner of the property is Mrs. Louise Thomas, Box 33, Ventress, Louisana 70783.

Mrs. Thomas has requested she be notified of the sample results as soon as possible so that she can decide whether to provide an on-line water treatment system for future occupants of the house.

Table 2 summarizes the samples collected and associated field measurements. The samples were preserved, labeled and packed for shipment in accordance with Regional procedures. The samples were surrendered to the laboratory for analysis on August 15, 1986.

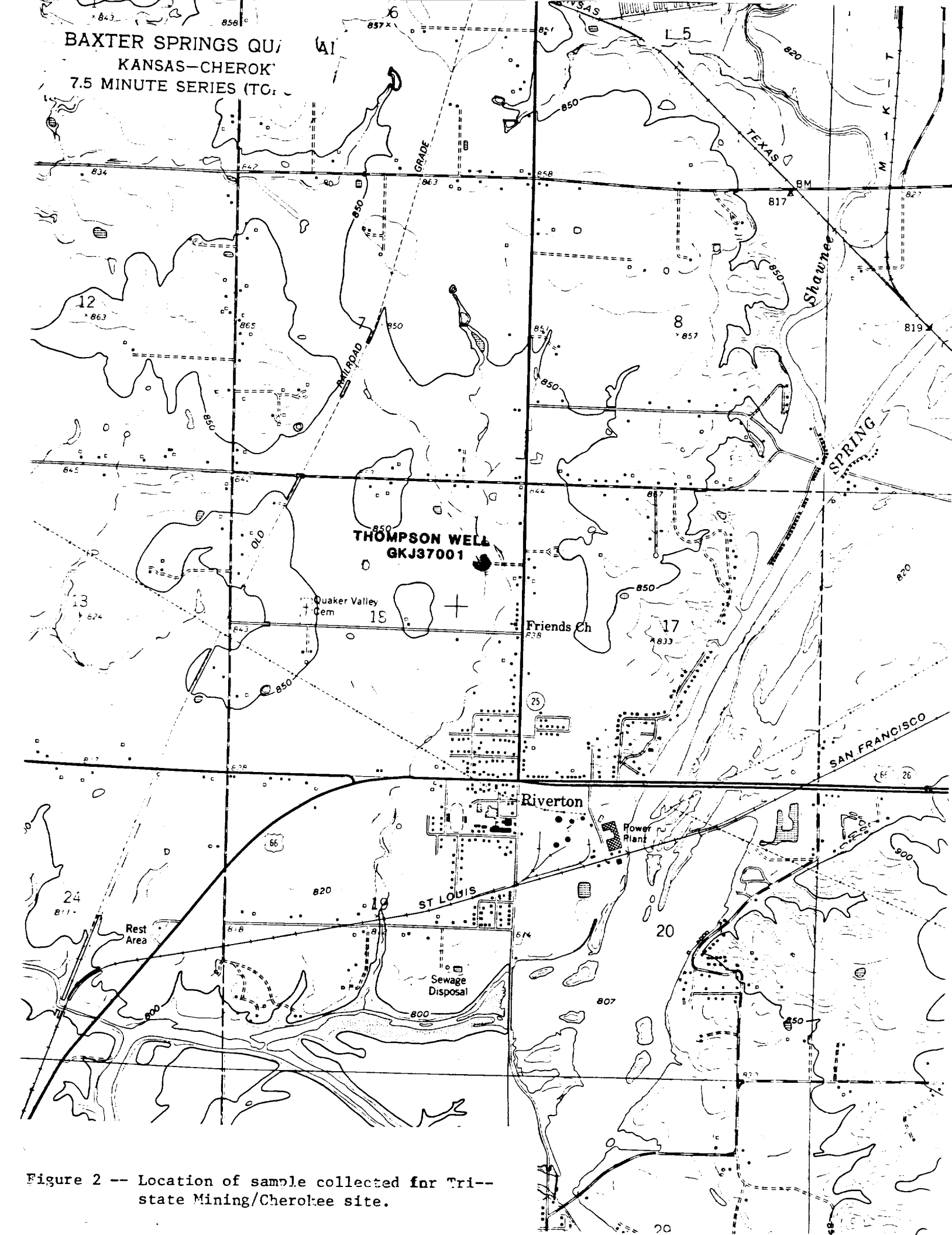

Figure 2 -- Location of sample collected for Tri-- state Mining/Cherokee site.

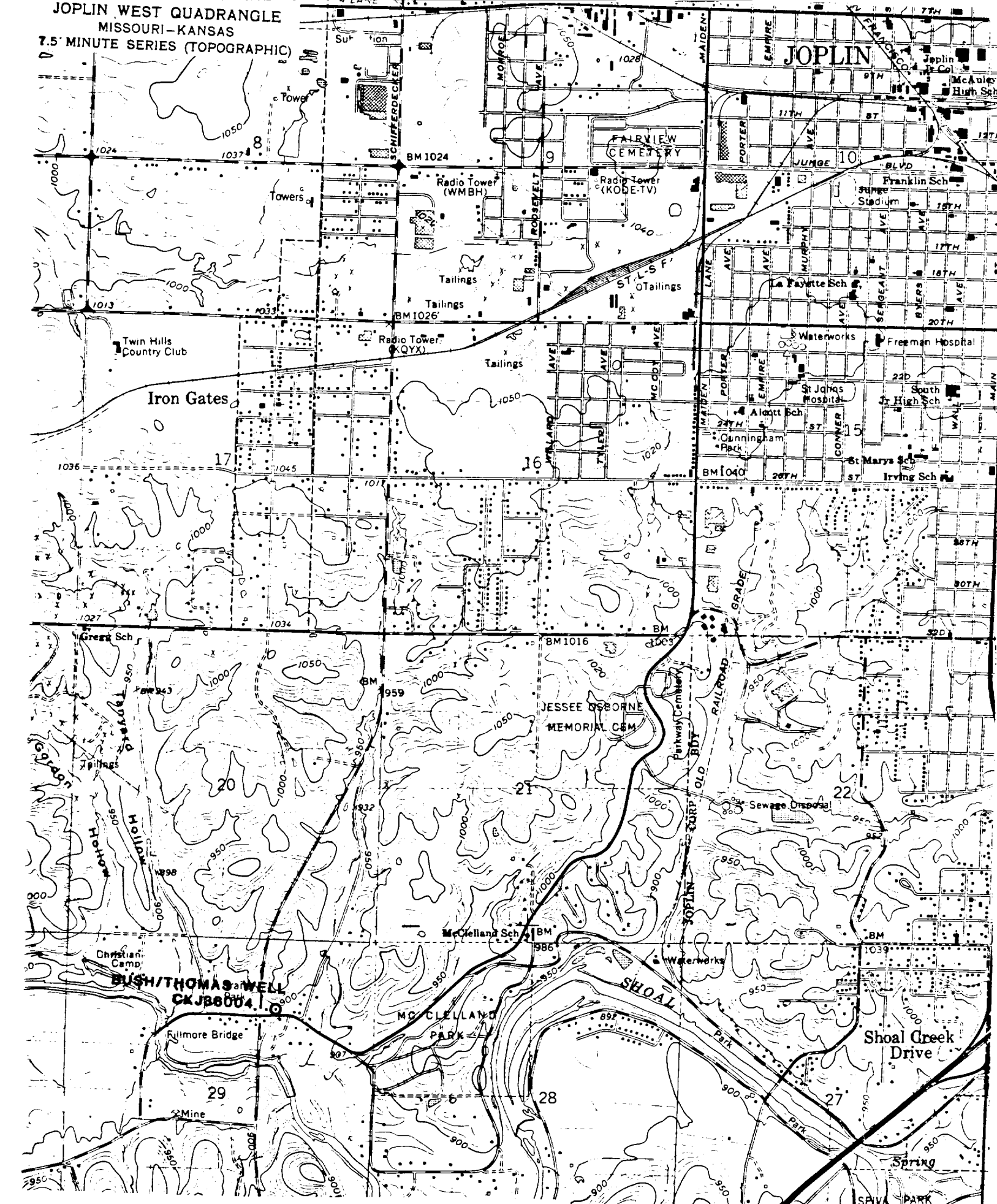

Figure 3 - Location of sample for Tri-state/Jasper site not located in Cronogo-Duenweg study area.

SAMPLE #	LOCATION	TEMP. C	pH	COND. umhos	DESCRIPTION
CKJ36001	Elsie Pendergraft RR #1 Webb City, MO (417)673-2863	17	6.7	380	well depth 120' to water 80' flow(gpm) 15 cased 88'
CKJ36002	Ben Summers RR #1 Joplin, MO (417)623-7955	18	6.6	1100	
CKJ36003	Emmit Southard RR #1 Joplin, MO (417)673-2863	19	7.0	660	Well used for livestock only
CKJ36004	Ralph Bush RR #5 Box 182 Joplin, MO (417)782-6163 H (417)781-9510 W	18	6.7	280	Request for Vickers sample cancelled. Out of study area for Tri-state
CKJ36005 &CKJ36006	Bobby Ballard RR #7 Joplin, MO (417)624-3861	22 B 22 A	6.6B 6.8A	1600 B 2000 A	AMF/CUNO Aquipure Filter model #AP100. Joplin Miracle water softner.
CKJ36007	P.E. Carr RR #1 Jopiln, MO (417)782-1690	17	7.2	775	
CKJ37001	Roger Thompson RR #1 Box 261 Galena, KS (316)848-3892	31	6.7	850	AMF/CUNO Aquipure Filter Model #AP1015 Tri-State Mining Cherokee

Table 2-- Summary of private well samples collected in Tri-state Mining District

DATA SUMMARY

The complete data transmittal was received from the Regional Laboratory on September 4, 1986. The data is summarized below in Table 3.

The latest round of samples indicate that the Pendergraft well still slightly exceeds the primary drinking water standard for cadmium (10 ug/l) with a concentration of 11 ug/l and 12 ug/l for duplicate samples. The Pendergraft well also exceeds the Centers for Disease Control's (CDC) recommendation for nickel (15 ug/l) with a concentration of 48 ug/l and 46 ug/l for duplicate samples. Sodium and lead levels were found to be acceptable (i.e., less than 20,000 ug/l and 50 ug/l respectively).

The Summer's well exhibited the highest levels of cadmium (42 ug/l). The February 1986, cadmium concentration was previously reported at 27 ug/l. The Summer's well water also contained elevated levels of nickel (43 ug/l) and sodium (24,000 ug/l). Lead levels were acceptable.

Table 3

Summary of August 1986 Sampling Results

Sample #	Location	Metal Concentration (ug/l) Cd	Ni	Na	Pb
CKJ36001	Pendergraft well	11	48	8,700	50U
CKJ36001D	Pendergraft well (Duplicate)	12	46	8,900	50U
CKJ36002	Summers Well	42	43	24,000	50U
CKJ36003	Southard Well	5U	20U	15,000	50U
CKJ36004	Bush Well	26	20U	5,900	50U
CKJ36005	Ballard Well (pre-filter)	5U	36	29,000	50U
CKJ36006	Ballard Well (post-filter)	5U	20U	470,000	50U
CKJ36007	Carr Well	5U	20U	16,000	50U
Drinking Water Recommendation		10*	15**	20,000***	50*

*EPA Primary Drinking Water Standard

**CDC Memorandum of January 17, 1985, citing "Clean Water Act, Water Quality Criteria for Human Health - Adjusted for Drinking Water Only"

***Recommendation of National Research Council, Food and Nutrition Board (1954) for people on sodium restricted diets.

The Southard livestock well had previously exhibited high concentrations of lead (79 ug/l). The latest round of samples revealed no elevated levels in the Southard well.

The Bush well contained high concentrations of cadmium (26 ug/l). Sodium, lead and nickel levels were acceptable.

The Ballard pre-filter sample showed high levels of nickel (36 ug/l) and sodium (29,000 ug/l). The Ballard post-filter sample indicates that nickel levels are being reduced to acceptable levels by the water treatment filter but that the filter is apparently contributing to gross sodium contamination of the water (470,000 ug/l). It should be noted that the Ballards do not presently use their well for drinking water purposes because of the objectionable taste.

The Carr well previously showed elevated levels of nickel (47 ug/l). The latest sampling did not detect any elevated concentrations of inorganics.

The complete data transmittal is attached.

CONCLUSIONS

Problems associated with the Tri-State Mining District are well documented in numerous reports by the U.S. Geological Survey, state geology and water quality reports, and site investigation reports by EPA Region VII. Some of these reports are listed in the reference section. The purpose of this sampling investigation was to resample wells that had shown high concentrations of metals when sampled in February 1986. Resampling was designed to further document the quality of water in these wells.

A total of six water samples were collected for the Tri-State Jasper area and were analyzed for total metals. Data results indicate that three wells contained cadmium in excess of EPA's primary drinking water standard (10 ug/l). Three wells contained nickel in excess of CDC's recommended level (15 ug/l). Two wells contained sodium in excess of the level recommended for sodium restricted diets (20,000 ug/l). In one case, an in-line water treatment filter utilizing sodium as an exchange ion appears to be contributing to gross sodium contamination of the water (470,000 ug/l).

REFERENCES

1. Barks, James H.; "Effects of Abandoned Lead and Zinc Mines and Tailings Piles on Water Quality in the Joplin Area, Missouri"; Water Resources Investigations 77-75, U.S. Geological Survey; Rolla, Missouri, 1977

2. Barks, James A. and Berkas, Wayne R.; "Water Quality in the Proposed Prosperity Reservoir Area, Center Creek Basin, Missouri"; Water Resources Investigations 79-22; U.S. Geological Survey; Rolla, Missouri, 1979

3. Berkas, Wayne R.; "Effects of the Proposed Prosperity Reservoir on Ground Water and Water Quality in Lower Center Creek Basin, Missouri"; Water Resources Investigations 80-88; U.S. Geological Survey; Rolla, Missouri, 1980

4. Harvey, E.J. and Emmett L.F.; "Hydrology and Model Study of the Proposed Prosperity Reservoir, Center Creek Basin, Southwestern Missouri"; Water Resources Investigations 80-77; U.S. Geological Survey; Rolla, Missouri, 1980

5. Vaughn, Steven; "Final Report for Tri-state Mining Area, Joplin, Missouri"; Ecology and Environment, EPA Region VII REM/FIT, TDD-R-07-8601-12A, 1986